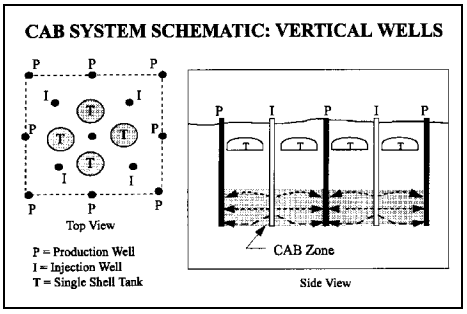
Circulating Air Barrier (CAB) System

Developer: K&M Engineering & Consulting Corp.
Contract Number: DE-AC21-90MC27346
Crosscutting Area: N/A

Subsurface Contaminants FOCUS AREA

Problem:

The movement of contaminated liquid from leaking tanks and contamination of soil and drinking water sources has been a concern at DOE's Hanford, Washington facility and many other DOE sites. Another concern is to segregate contaminated soils from uncontaminated soils and minimize the soil remediation costs.



Solution:

The Circulating Air Barrier (CAB) System is an innovative desiccant-type barrier, based on commercially available technologies, that:

- Prevents the movement of liquid contaminants toward the groundwater
- Minimizes the amount of soil that must be eventually remediated
- Is an effective method of leak detection

The CAB technology is based on the concept of using a gas circulation, processing, and monitoring system to lower the water saturation in a targeted subsurface zone below the saturation level required for liquid flow through that zone.

Benefits:

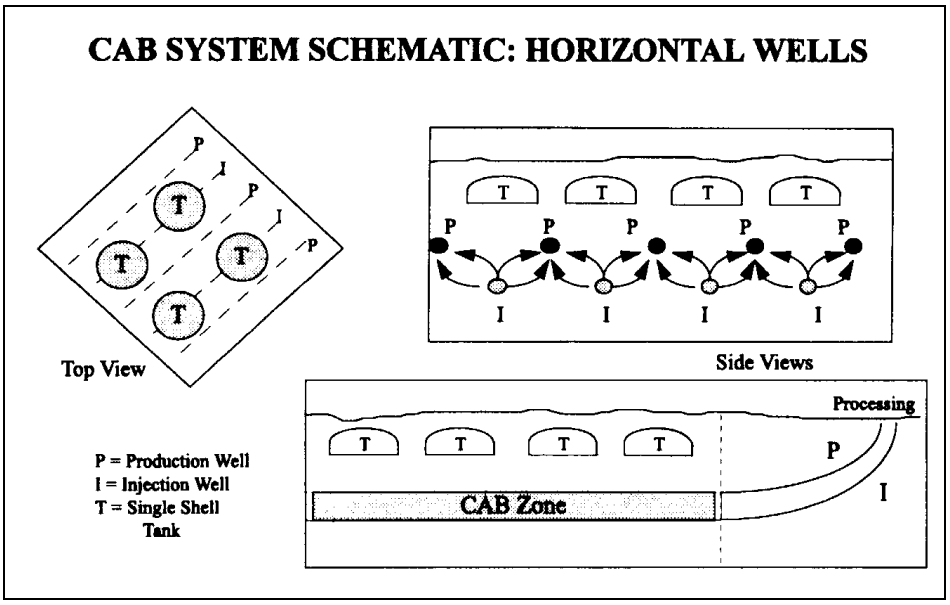
- CAB forms an "invisible" in situ, and non-physical wall which separates contaminated from non-contaminated soils
- CAB provides an active monitoring system and leak detection capability
- CAB technology is based on proven, commercially available technologies and equipment
- CAB technology has a high potential for emergency response and rapid deployment
- CAB can be integrated with other remediation technologies because of its leak detection and monitoring capabilities
- CAB system design is flexible and can be applied to a single tank or a tank farm using various drilling techniques

Technology:

The CAB technology differs from other barrier technologies because it is a non-physical barrier and because of its leak detecting and monitoring capability.

The CAB system concept involves the circulation of air or another gas through a subsurface interval in order to lower and then maintain the water saturation below the level required for liquid flow through the subsurface. The "invisible" barrier can be installed using either vertical or horizontal wells, establishing a pattern of air injection and production so that the injected air moves from the injection wells through the ground formation to the production wells. The number and the location of the wells is dependent on the soil conditions, site geology, and the system operating parameters. The moving air vaporizes water in the zone and carries the water vapor to the production (extraction) wells. The production stream is then processed

in a surface facility to remove the water and any contaminants or particulates. In time, the circulating air reduces the water saturation in the swept interval, and continues to remove, by evaporation, liquids that move into the zone, such as a leak plume. In the event of a leak, the system serves as a tool for early detection and provides a means to withdraw volatile contaminants to the surface for treatment.



Project Conclusion:

This activity was completed in the Fall of 1994. At completion the design for implementation of the barrier system had been completed. The decision not to continue this project was made due to lack of DOE need for this specific technology, given the advancing development of other technologies for similar applications.

Contacts:

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DOE's Morgantown Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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